

# *The African Organisation for Standardisation*

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ARS 851 (2012) (English): Frozen potato  
chips -- Specification



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**Frozen potato chips — Specification**



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## Foreword

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## Frozen potato chips — Specification

### 1 Scope

This African Standard specifies the requirements and methods of sampling and test for frozen potato (*Solanum tuberosum* L.) chips to be supplied packaged either in retail packs or in bulk for human consumption.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Prepackaged foods — Labelling*

ARS 471, *Food grade salt — Specification*

WD-ARS 847:2012, *Fresh potato tubers — Specification*

WD-ARS 849:2012, *Reduction of acrylamide in potato products — Code of practice*

CODEX STAN 192, *General standard for food additives*

CODEX STAN 193, *Codex general standard for contaminants and toxins in food and feed*

ISO 3960, *Animal and vegetable fats and oils — Determination of peroxide value — Iodometric (visual) endpoint determination*

ISO 4832, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coliforms — Colony-count technique*

ISO 4833, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of microorganisms — Colony-count technique at 30 degrees C*

ISO 5498, *Agricultural food products — Determination of crude fibre content — General method*

ISO 6579, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Salmonella spp.*

ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium*

ISO 6888-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 2: Technique using rabbit plasma fibrinogen agar medium*

ISO 6888-3, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 3: Detection and MPN technique for low numbers*

ISO 7251, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli — Most probable number technique*

ISO 10520, *Native starch — Determination of starch content — Ewers polarimetric method*

ISO 21527-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of yeasts and moulds — Part 2: Colony count technique in products with water activity less than or equal to 0.95*

ISO/TS 21872-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of potentially enteropathogenic Vibrio spp. — Part 1: Detection of Vibrio parahaemolyticus and Vibrio cholerae*

ISO/TS 21872-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of potentially enteropathogenic Vibrio spp. — Part 2: Detection of species other than Vibrio parahaemolyticus and Vibrio cholerae*

## 3 Definitions

For the purpose of this standard the following definitions apply.

### 3.1

#### **frozen potato chips**

product prepared from washed, mature, sound tubers of the potato plant of the species and subjected to a freezing process in the appropriate equipment.

### 3.2

#### **presentation styles:**

#### 3.2.1

##### **straight cut**

strips of potato with practically parallel sides and with smooth surfaces

#### 3.2.2

##### **crinkle cut**

strips of potato with practically parallel sides and in which two or more sides have a corrugated surface

### 3.3

#### **external defects**

blemishes or discolourations (either internally or on the surface) due to exposure to light, mechanical, pathological or pest agents, eye material or peeling remnants

#### 3.3.1

##### **minor defect**

unit affected by disease, dark or intense discolouration, eye material, or dark peel covering an area or a circle greater than 3 mm but less than 7 mm in diameter; pale brown peel or light discolouration of any area greater than 3 mm in diameter

#### 3.3.2

##### **major defect**

unit affected by disease, dark or intense discolouration, eye material, or dark peeling covering an area or a circle greater than 7 mm but less than 12 mm in diameter

#### 3.3.3

##### **serious defect**

unit affected by disease, dark or intense discolouration, eye material, or dark peel covering an area or a circle of 12 mm in diameter or more

#### 3.3.4

##### **slight defect**

defects which in either area or intensity fall below the definition shown for minor defects



### **3.4 sorting defects**

#### **3.4.1 sliver**

very thin unit (generally an edge piece) which will pass through a slot the width of which is upto 50 % of the minimum dimension of the nominal or normal size

#### **3.4.2 small piece**

any unit less than 25 mm in length

#### **3.4.3 scrap**

potato material of irregular form not conforming to the general conformation of frozen potato chips

### **3.5 burnt pieces( frying and blanching defects)**

any unit which is dark brown and hard due to inappropriate blanching and over-frying

### **3.6 Practically free**

product without defects in excess of those that can be expected to result from, and be consistent with good cultural and handling practices employed in the production and marketing of the frozen potato chips

## **4 Process requirements**

### **4.1 Preparation and freezing process**

Potato tubers for making frozen chips shall be sorted, washed, peeled, cut into strips, and treated as necessary to achieve satisfactory colour and ensure adequate stability of colour and flavour during normal marketing cycles.

The treatment may include blanching or deep frying in a suitable fat or oil and which may include the addition of any ingredient permissible in accordance with CODEX STAN 192.

The prepared product shall be frozen and stored at temperatures necessary for its preservation.

The freezing operation shall be carried out in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete unless and until the product temperature has reached -18 °C at the thermal centre after thermal stabilization. The practice of repacking frozen potato chips under controlled conditions may be undertaken.

### **4.2 Handling practice**

The product shall be handled under such conditions as will maintain the quality during transportation, storage and distribution up to and including the time of final sale in accordance to ARS 53 and CAC/RCP 53.

## **5 Presentation styles**

### **5.1 General**

The product shall be presented in one of the following styles:

- straight cut; and
- crinkle cut.

## 5.2 Cross sectional dimensions

The cross sectional dimensions of strips of frozen potato chips which have been cut on all four sides shall not be less than 5 mm when measured in the frozen condition. The frozen potato chips within each pack shall be of similar cross sections.

5.3 The product designations shall comply with the requirements stipulated in Table 1.

**Table 1 — Designations for the dimensions across the largest cut surface**

Designation	Dimension across the largest cut surface, mm
Shoestring	5 – 8
Medium	8 – 12
Thick cut	12 – 16
Extra large	> 16

## 5.4 Other styles

Frozen potato chips may be presented with any other presentations based on differing cross sections provided that it

- a) is sufficiently distinctive from other forms of presentation laid down in this standard,
- b) meets all other requirements of this standard, and
- c) is adequately described on the label to avoid confusing or misleading the consumer.

## 6 Compositional and quality requirements

### 6.1 Ingredients

#### 6.1.1 Basic ingredients

These shall include the following:

- a) potatoes conforming to WD-ARS 847:2012; and
- b) edible fats and oils conforming to the relevant African Standards if fried.

#### 6.1.2 Optional ingredients

These shall include the following:

- a) sugars (sucrose, invert sugar, dextrose, fructose, glucose syrup, dried glucose syrup) conforming to national standards;
- b) salt (sodium chloride), conforming to ARS 471; and
- c) spices and condiments, conforming to relevant African Standards.

### 6.2 General quality requirements

Frozen potato chips shall:

- a) be free from any foreign flavours and odours;
- b) be clean, sound and practically free from foreign matter; and

- c) have a reasonably uniform colour;
- d) have a texture characteristic of the product.

### 6.3 Moisture content

The maximum moisture content of the whole product in the styles and size designations when determined in accordance with Annex A shall conform to the limits in Table 2.

**Table 2 — Limits for moisture content in frozen potato chips**

Style	Size designation	Moisture content
Straight cut	Shoestring, medium, thick cut	76
	Large cut	78
Crinkle cut	Shoestring, medium, thick cut	76
	Large cut	78
Other styles	—	78

### 6.4 Free fatty acid content

For fried frozen potato chips, the fat or oil extracted from the product shall have a free fatty acid content of not more than 1.5 % m/m measured as oleic acid or an equivalent fatty acid value based on the predominant fatty acid in the fat or oil. The test for free fatty acids shall be done in accordance with Annex B.

### 6.5 Defects

Frozen potato chips shall meet the following requirements with respect to visual defects subject to a tolerance in 6.6:

- a) be without excessive defects such as blemishes, eyes and discolouration;
- b) be without excessive sorting defects, such as slivers, small pieces and scrap; and
- c) be reasonably free from frying defects, such as brown parts .

### 6.6 Tolerances for visual defects

Tolerances on defects shall be determined based on the standard sample size of 1 kg (see Clause 13). The visual external defects shall be classified as "minor" or "major" or "serious" depending on the cross section of the frozen potato chips. The standard samples shall not contain units in excess of the numbers shown for the respective categories, including total, in Table 3.

**Table 3 — Tolerances for external defects**

Cross section of strips	Number of units affected		
	Serious	Serious +major	Serious + major + minor
5 - 16 mm	7	21	60
Over 16 mm	3	9	27

The tolerances for the other defects (not depending on cross section) shall not exceed the following limits:

- a) slivers max. 12 % m/m;
- b) small pieces and scraps max. 6 % m/m;
- c) total sorting defects max. 12 % m/m; and

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d) frying defects max. 0.5 % m/m.

### 7 Food additives

Food additives may be used in accordance with CODEX STAN 192.

### 8 Contaminants

#### 8.1 Pesticide residues

Frozen potato chips shall conform to the maximum residue limits for pesticide residues recommended by Codex Alimentarius Commission.

#### 8.2 Other contaminants

Frozen potato chips roots shall comply with the maximum levels of the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193).

### 9 Hygiene

Frozen potato chips shall be prepared, packaged and stored under hygienic conditions in accordance with ARS 53; the frozen chips shall conform to the microbiological limits in Table 4

Table 4— Microbiological requirements for potato crisps

Micro-organism(s)	Maximum limit	Method of test
Total viable count, CFU per gram, max	10 <sup>4</sup>	ISO 4833
<i>Escherichia coli</i> , CFU per gram	Shall be absent	ISO 7251
<i>Salmonella</i>	Shall be absent	ISO 6579
Yeasts and moulds, CFU per gram	10 <sup>3</sup>	ISO 21527-2

### 10 Packaging

10.1 Frozen potato chips shall be packaged in food grade material which will safeguard the hygienic, nutritional, and organoleptic qualities of the product. The material shall be moisture and air proof, oil proof and well-sealed to prevent spoilage or contamination.

10.2 The net weight of the packages for frozen potato chips may be required to comply with the relevant regulations of the destination country.

### 11 Labelling

In addition to the requirements of ARS 56, the following specific labelling requirements shall apply and shall be **legibly** and **indelibly** marked;

a) name of the food:

- i) the name of the food as declared on the label shall include the designation "Frozen potato chips" or the equivalent designation used in the country in which the product is intended to be sold;
- ii) in addition, there shall appear on the label a designation of the style as appropriate, that is "straight cut" or "crinkle cut" and there may also appear an indication of the approximate dimensions of the cross section or the appropriate designation, that is "shoestring", "medium", "thick cut" or "extra large";

- iii) if the product is presented in styles not listed in this standard, the label shall contain in close proximity to the words "Frozen potato chips" such additional words or phrases that will avoid misleading or confusing the consumer; and
- iv) the words "Frozen" shall also appear on the label, except that the term "quick Frozen" may be applied in countries where this term is customarily used for describing the product processed in accordance this standard. In addition, any pre-freezing treatment applied on the product shall be indicated;
- v) A process description as blanched, par-fried or fully fried;
- b) packages shall bear clear directions for keeping from the time they are purchased from the retailer to the time of their use, as well as directions for cooking; and
- c) in the case of frozen potato chips in bulk, the information required above shall either be placed on the container or be given in accompanying documents, except that the name of the food accompanied by the words "frozen" (the term "quick frozen" may be used in accordance with (a) (iv); and
- d) name and physical address of the manufacturer or packer and or brand/trade names
- e) Best before date
- f) Declaration of spices and condiments used.

## **12 Sampling**

The standard sample size shall be one kilogramme.

## **13 Criteria for conformity**

A lot shall be declared as conforming to this standard if each sample inspected or analyzed for quality requirement conforms to the provision of this standard



**Annex A**  
(normative)

**Determination of moisture content**

**A.1 Procedure**

Weigh accurately 10 g of the material in a suitable moisture dish previously dried in an electric oven and weighed. Place the dish in an electric oven maintained at  $105\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$  for 5 h. Cool the dish in a desiccator and weigh with the lid on. Repeat the process of heating, cooling and weighing at half-hour intervals until the loss in weight between two successive weighings is less than 1 mg. Record the lowest weight obtained.

**A.2 Calculation and expression of results**

$$\text{Moisture, percent by mass} = \frac{(M_1 - M_2) \times 100}{M_1 - M_3}$$

where,

$M_1$  is the mass, in grams, of the dish and sample before drying;

$M_2$  is the mass, in grams, of the dish and sample after drying;

$M_3$  is the mass, in grams, of the dish only.

## Annex B (normative)

### Determination of free fatty acids

#### B.1 Apparatus

Soxhlet fat extraction apparatus

#### B.2 Reagents

**B.2.1 Petroleum ether**, distilling below 65 °C, or ethyl ether

**B.2.2 Alcohol potassium hydroxide**, 0.1 N (use absolute or alcohol denatured with methanol, [MeOH])

**B.2.3 Alcohol-ether mixture**, equal volumes of 96 % alcohol and ethyl ether

**B.2.4 Phenolphthalein solution**, 1 % in alcohol or alcohol denatured with methanol (MeOH)  
Add 0.3 ml per 100 ml mixture of alcohol-ether and add alcoholic KOH solution to a faint pink.

#### B.3 Procedure

Extract 10.00 g ± 0.01 g of the sample taken in a thimble with petroleum ether for about 4 h in a Soxhlet extraction apparatus. Completely evaporate the solvent from the extraction flask (weighed previously) on a steam bath, cool and weigh the extraction flask with the residue. Dissolve the residue in the extraction flask with the 50 ml of the alcohol-ether phenolphthalein solution. Titrate the dissolved extract, with standard potassium hydroxide solution, to a faint pink colour, which persists for 10 s. If emulsion is formed during titration, dispel by adding a second 50 ml portion of the alcohol-ether phenolphthalein solution.

Make a blank titration on 50 ml of the alcohol-ether phenolphthalein solution and subtract this value from the titration value of the sample. If the additional 50 ml portion of the alcohol-ether phenolphthalein solution is added, double the blank titration.

#### B.4 Calculation

Calculate the acid value from the following formula:

$$\text{Acid value (as oleic acid)} = \frac{56.1VN}{M}$$

where,

$V$  is the volume, in millilitres, of standard potassium hydroxide solution used;

$N$  is the normality of standard potassium hydroxide solution; and

$M$  is the mass, in grams, of the material taken for the test.

**Bibliography**

EAS 746:2010, *Frozen potato chips — Specification*

Draft African Standard for comments only — Not to be cited as African Standard

Draft African Standard for comments only — Not to be cited as African Standard